DRAFT

ENTERPRISE II

System Motherboard

User's Guide

Introduction iii

Section 1 UNPACKING AND INSTALLATION INSTRUCTIONS

1.1 Unpacking the AMI 486 Enterprise Motherboard 1-1
1.2 Installing the AMI 486 Enterprise Motherboard 1-3
1.3 Connecting the AMI 486 Enterprise Motherboard 1-7
1.4 Connecting Floppy Drives to the Motherboard Floppy Controller 1-13
1.5 Installing Adapter Cards (EISA or ISA) 1-14

Section 2 POWERING UP YOUR MOTHERBOARD

2.1 Initial Power-Up Checklist 2-1
2.2 Initial Power-Up 2-1
2.3 Memory Test Bypass 2-3
2.4 Cache Test 2-4
2.5 Test for AMI Module Presence Autodetect 2-5
2.6 Run the System Setup (SETUP) Utility . 2-5
2.7 Summary of SETUP Screen 2-6
2.8 Setup Screen Display 2-7
2.9 Errors Reported by BIOS 2-14
2.10 User Selectable Options Through Keyboard 2-26

Section 3 **SYSTEM OVERVIEW**

Section 4 **ADVANCED ROM DIAGNOSTICS**

4.1 Selecting the Advanced Diagnostics Option 4-1
4.2 Diagnostics Menu 4-2
4.3 Hard Disk Diagnostics 4-3
4.4 Floppy Diagnostics 4-10
4.5 Keyboard Diagnostics 4-12
4.6 Video Diagnostics 4-12
4.7 Miscellaneous Diagnostics 4-13

Section 5 **INSTALLING MOTHERBOARD DRAM**

5.1 Installing SIMM modules 5-1
5.2 Testing SIMM Memory 5-2

Section 6 **INSTALLING A MEMORY CARD**

6.1 To order a 32-bit Memory Card for Memory Upgrade 6-1
6.2 Unpacking the AMI 32-bit Memory Card 6-2
6.3 Installation of SIMM's on 32-bit Memory Card 6-2
6.4 Installation of 32-bit Memory Card 6-4

Section 7 **INSTALLING A WEITEK**

7.1 Installing the Weitek 4167 Coprocessor 7-1

Section 8 **SERIES-31 AMI MODULE**

8.1 To Order the AMI Module.....8-1
8.2 Unpacking the AMI Module.....8-2
8.3 Installation of the AMI Module on Enterprise-II..... 8-2
8.4 Connectors on the Module..... 8-3
8.5 Option Jumpers..... 8-4
8.6 BIOS Support..... 8-.5

Appendix A **HARD DISK DRIVE TYPES**

Congratulations.

You have purchased the AMI 486 Enterprise II System Motherboard. The AMI EISA motherboard was introduced to the public at Las Vegas COMDEX, Fall 1990.

This manual was written to assist you in ensuring that your board works the first time. Please take a few minutes and read Section 1 on Unpacking and Installation Instructions before installing your new motherboard.

After integrating the whole system, if it does not function properly or behaves erratically after it is powered on, give our Technical Support a call. Please have the following information available:

1. Serial Number .....
2. Rev Number .....
3. Memory Configuration Type .....

   Speed .....
4. System BIOS reference number .....
   (Bottom of Opening Screen)
5. Input/Output cards installed .....

   .....

   .....
6. A description of the malfunction and what procedures you have already taken.

Our number is 1-800-U-BUY-AMI (1-800-828-9264) or 1-404-263-8181

THANK YOU from

AMERICAN MEGATRENDS, INCORPORATED
1346 Oakbrook Drive, Suite 120
Norcross, GA 30093

(C) COPYRIGHT AMERICAN MEGATRENDS, INC. 1991

All rights reserved. This publication contains proprietary information which is protected by copyright. No part of this publication may be reproduced, transcribed, stored in a retrieval system, translated into any language or computer language, or transmitted in any form whatsoever without the prior written consent of the publisher, American Megatrends, Inc.

LIMITED WARRANTY

Buyer agrees if this product proves to be defective, that American Megatrends, Incorporated (hereafter referred to as AMI) is only obligated to replace or refund the purchase price of this product at AMI's discretion. AMI shall not be liable in tort or contract for any loss or damage, direct, incidental or consequential. Please read enclosed warranty card.

Important Notice

AMI is not responsible for any errors or omissions in writing this manual. AMI reserves the right to change, modify or append any part or section of this manual at any time.

TRADEMARKS

Intel, 286, 80286, 386, 80386, 486, 80486, 387, and 80387 are all trademarks of Intel Corporation.

IBM XT and AT are trademarks of International Business Machines Corporation.

WEITEK is a trademark of WEITEK Corporation.

AMI 486 Enterprise II USER MANUAL
This manual written and edited by Julia H. McDonald and Robert C. Cheng.

WARNING !!!

The AMI 486 Enterprise-II motherboard contains static sensitive components. Follow instructions to prevent damage to these components by static electricity.

1.1 Unpacking the AMI 486 Enterprise-II Motherboard

AMI wants you to have a trouble-free installation. Please read this section carefully to ensure that you do not damage the AMI 486 Enterprise-II through a commonly ignored hazard: *Electrostatic Discharge (ESD).*

CAUTION !!!

Do not remove the AMI 486 Enterprise-II motherboard from its protective anti-static bag until you are ready to install it in the system. Unpacking of the AMI 486 Enterprise-II motherboard should be done on an anti-static mat grounded to a good earth ground point. The operator should also be wearing an anti-static wristband, grounded at the same point as the anti-static mat. (An alternative solution to purchasing an anti-static mat is to use a sheet of conductive aluminum foil grounded through a 1 Meg-ohm resistor to the earth ground. Similarly, a strip of conductive aluminum foil wrapped around the wrist and grounded through a 1 Meg-ohm resistor will serve the purpose of a wristband.)

1) Inspect the shipping container for obvious damage. If there is any damage to the shipping

container, do not throw it away. In the event of damage to the motherboard caused by handling, the shipping container is required to file a claim against the carrier.

NOTE

Save the original AMI Motherboard box, two pieces of foam, and the anti-static bag. You will need these pieces if you return the motherboard to the distributor for any reason.

When you open the shipping container, make sure that the following items are included. If any item is missing, please call us at the number listed on page ii.

1. Enterprise-II Motherboard
2. Enterprise-II Manual
3. ECU Diskette
4. ECU Manual

2) The motherboard is packaged in an anti-static bag inserted between two sheets of foam. Remove the top layer of foam and carefully remove the anti-static bag. **DO NOT** remove the motherboard from the anti-static bag until you are ready to place it on the grounded mat. Place the anti-static bag with the motherboard component side up on the anti-static mat. With your wrist strap on, grasp the end of the motherboard and slowly withdraw the motherboard from the anti-static bag, being careful not to snag any components. Place the motherboard, component side up, on the grounded mat and inspect it for visible damage.

NOTE

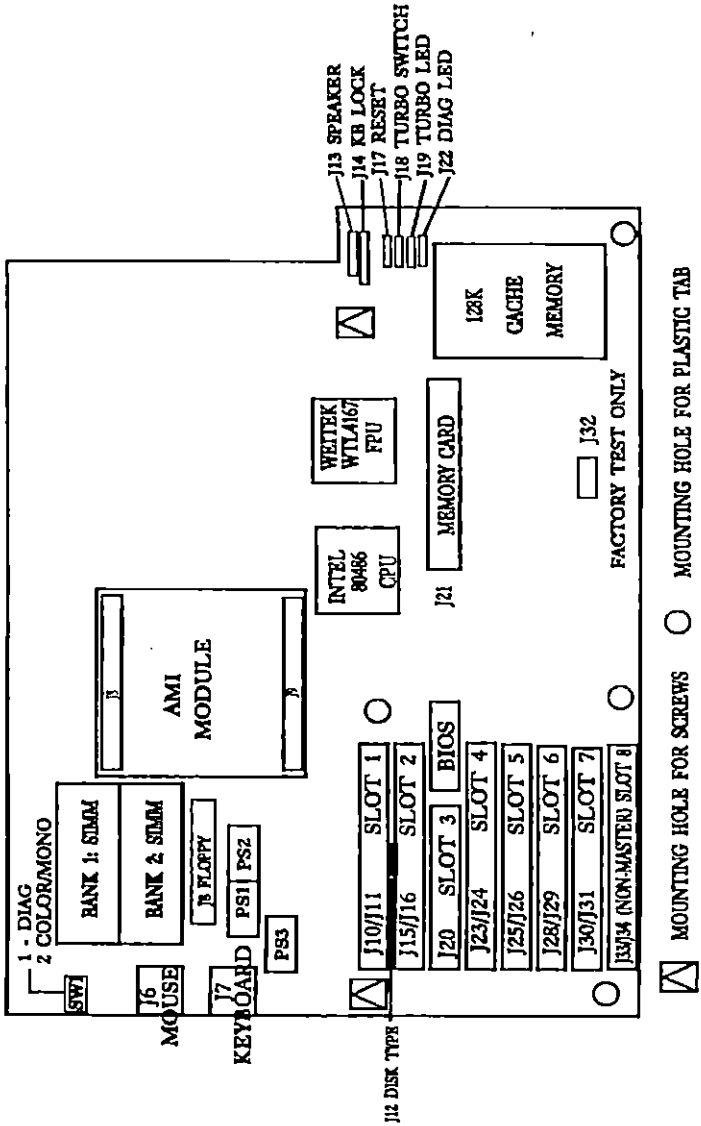
If there is any apparent damage at this time, do not proceed any further. Place **all** pieces back in the box and immediately contact the distributor you purchased the motherboard from.

3) It is possible that during shipment the socketed Integrated Circuits (ICs) may have vibrated loose in their sockets. With the motherboard positioned component side up on the anti-static mat, firmly and gently press down on all socketed ICs to assure they are properly seated.

4) Inspect all the connectors for foreign material and confirm that all the pins on the berg-pins are straight. Use a pressurized spray to remove any foreign material; do not use any metal tools on the connectors. If the material cannot be removed using pressurized spray, contact your distributor. Straighten berg-pins using a small pair of straight long-tipped needle nose pliers. Slowly reshape the pin; do not bend it back and forth.

1.2 Installing the AMI 486 Enterprise-II Motherboard

Before proceeding, please familiarize yourself with the layout of the AMI 486 Enterprise-II motherboard using Figure 1-1.



Enterprise-II Motherboard
Figure 1-1

1) The AMI 486 Enterprise-II motherboard is shipped with factory set jumper and switch settings. Before installing the motherboard, please check to make sure the jumper and switch settings match the list below. If they do not match, correct them according to the descriptions below:

SW1 - (2-position switch) The switch position which has the word **DIAG** printed on the board is used for factory testing only. **This switch must be in the OFF position.**

COL/MONO - This switch sets the type of video display adapter in the system. This switch is factory set to **OFF** position for a Monochrome display (MDA,HERC,etc). Set this switch to **ON** position if you want to use a color display (CGA). The setting of this switch has no effect if the display adapter is EGA or VGA.

J12 - (DISKTYPE, 3-PIN BERG) Factory setting is pins 1 and 2 shorted by a jumper block.

J32 - (2-PIN BERG) This jumper should be open. This is used for factory manufacturing testing.

2) When you purchased your AMI 486 Enterprise-II motherboard, it was configured as you requested. If the SIMM (Single In line Memory Module) modules are not installed or you are adding SIMM modules to increase memory size, proceed to Section 5 at this time.

3) If you purchased a Weitek WTL 4167 co-processor for your AMI 486 Enterprise-II motherboard and it is not installed, proceed to Section 7 at this time.

CAUTION

Before proceeding, attach a ground wire from any bare metal area on the main chassis to the same grounding point as your wrist strap. This will protect the motherboard from electrostatic discharge.

NOTE: If you are replacing an existing motherboard with the AMI 486 Enterprise-II motherboard, remove the I/O cards, power connectors, and berg connectors. Place the old board next to the AMI 486 Enterprise-II and transfer the standoffs. Then proceed to step 4.

4) The AMI 486 Enterprise-II will fit into any standard AT board chassis. All required mounting hardware should have been supplied with your chassis. No hardware is supplied with the motherboard. Remove the chassis cover and position the chassis beside the board.

Carefully position the board inside the case where it is to be mounted. Determine the position of the holes for the plastic standoffs. Place the motherboard on a piece of the shipping foam and firmly press the standoffs into the required holes until the locking pins snap into place. On the chassis, install the plastic edge supports in the required holes. Next, install the metal standoffs in the drilled screw holes on the chassis. Be careful not to strip the threads.

5) Carefully slide the motherboard into the chassis, making sure that the stand-offs go into the slots provided for them. Ensure that the motherboard is level with the chassis. The edge of the motherboard should fit into the slots of the chassis mounted plastic clips. If the motherboard is not seated properly, remove it carefully and try again.

Put the two motherboard mounting screws in the holes provided for them and tighten them. Do not over-torque or you may damage the board. (Note: You may have to shift the motherboard slightly to align the screw mounting holes on the motherboard with those on the chassis.)

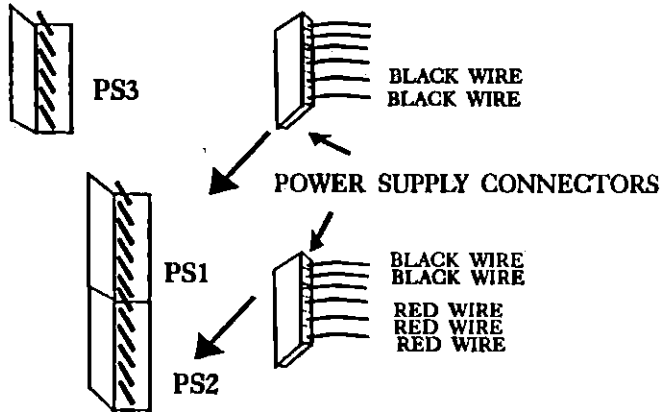
1.3 Connecting the AMI 486 Enterprise-II Motherboard.

Now that the motherboard is mounted properly, the power supply, keyboard, and mouse connectors as well as adapters must be installed properly before the system is powered on.

Connecting the POWER SUPPLY

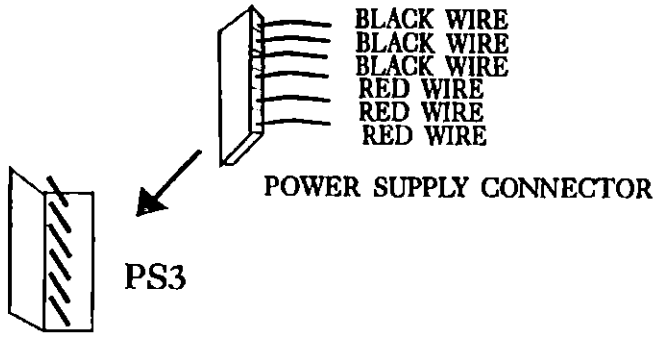
Refer to figure 1-1 for the location of connectors **PS1** and **PS2**. These are standard 6-pin power supply connectors. Normal AT- compatible power supplies have two 6-pin connectors which are inserted into **PS1** and **PS2**. The 6-pin connector with **3 red wires** and **2 black wires** should be connected to **PS2** and the remaining 6-pin connector should be connected to **PS1**. Refer to Figure 1-2 for illustration.

NOTE: The standard 200-250W power supply is not sufficient for the EISA Enterprise-II board if all EISA slots are filled with EISA compatible adapters. A third power supply connector, **PS3**, has been provided for extra power. Some 400W power supplies have an extra 6-pin connector which can be connected to **PS3**.



Installing Power Supply Cable
Figure 1-2

The pin specifications for the power supply connectors are given below. Please take time to make sure that the third power supply plug (if any) matches the pin specifications of connector **PS3** below. Refer to Figure 1-3 for illustration.



Power Supply Connector
Figure 1-3

	PIN	ASSIGNMENT
PS1	1	Power Good
	2	VCC
	3	+ 12V
	4	- 12V
	5	Ground
	6	Ground
PS2	1	Ground
	2	Ground
	3	- 5V
	4	VCC
	5	VCC
	6	VCC

PS3	1	Ground
	2	Ground
	3	Ground
	4	VCC
	5	VCC
	6	VCC

Please refer to Section 2 for Power requirements and power supply specifications.

Connecting the KEYBOARD

The keyboard connector **J7** is a 5-pin DIN socket and is marked as KEYBRD on the motherboard. It will accept a regular IBM AT-compatible keyboard. If you wish to connect an IBM PS/2-compatible keyboard, you will need a 5-pin DIN to 6-pin mini DIN converter.

Connecting the MOUSE

The mouse connector **J6** is a 6-pin mini DIN socket. You can connect an IBM PS/2 compatible mouse in this socket.

Installing chassis connectors to the motherboard

When hooking up chassis connectors to the motherboard, make sure you are hooking up the right connector end. Since most connector wires are color-coded, so you can look at the color of the wires leaving the switch or LED and match the connector end. It is possible to have more than one connector with the same color-coded wires, so it is good to double-check by following the wire to the switch or LED.

In Figure 1-1, pin 1 of all the connectors are marked to help you identify the pin orientation when plugging in cables.

J13: Audio Connector - 4 pin single-in-line BERG. The speaker is used by the AMI ROM BIOS to signal hardware problems. Many programs also use a speaker for a variety of purposes. Pin 1 on the motherboard is marked with a plus (+) sign.

Pin	Assignments
1	Data Out
2	Key
3	Ground
4	VCC

NOTE: The following feature is NOT functional in present motherboards.

J14: Keyboard Lock Connector - 5 pin single-in-line BERG. This allows the user to lock-out the keyboard, protecting the system from unauthorized use. This connector is keyed with a blank hole. Pin 1 on the motherboard is marked with a plus (+) sign.

Pin	Assignments
1	LED power
2	Key
3	Ground
4	Keyboard Inhibit
5	Ground

J17: Reset Button Connector - 2 pin single-in-line BERG. When this button is pressed, the system will perform a hard reset.

Pin	Assignments
1	Ground
2	Hard Reset

J18: Turbo Switch Connector - 2 pin single-in-line BERG. When this button is pressed, the system will switch to high or low CPU speed.

Pin	Assignments
1	Ground
2	Mode switch

J19: Turbo LED Connector - 2 pin single-in-line BERG. The LED will be lit when board is running at high speed.

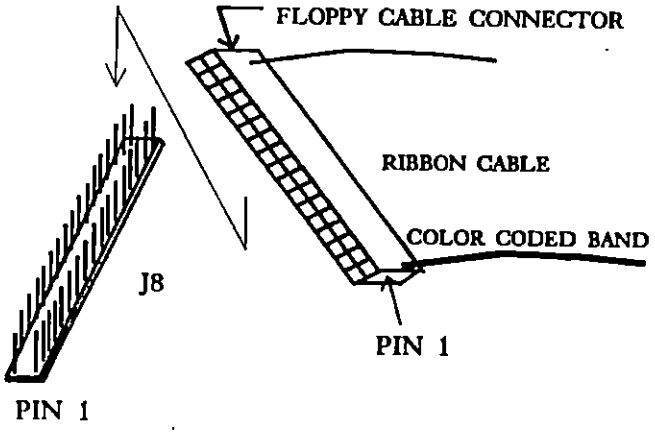
Pin	Assignment
1	LED power
2	Clock Speed

NOTE: If, after booting up with DOS, pressing <CTRL><ALT><+> does not switch the board into turbo mode, you may have the Turbo LED plug connected incorrectly. Reverse the connection and try to switch to turbo mode again. If the system still does not switch to turbo mode, then the Turbo LED may be defective.

1.4 Connecting floppy drives to the motherboard floppy controller.

Skip this section if you do not want to use the built-in motherboard floppy controller.

J8 is a 34-pin dual-in-line BERG connector for floppy connection. Using Figure 1-1, identify the position of connector **J8** on the motherboard. Pin 1 of J8 is marked by a '**1**' on the motherboard and also in Figure 1-1. Identify pin 1 of the 34-pin floppy ribbon cable identified by a colored stripe on one side of the cable. Push the 34-pin floppy cable completely into the J8 connector on the motherboard so that position pin 1 of the connector and pin 1 of the plug match. Refer to Figure 1-4 for illustration.



Installing Floppy Cable
Figure 1-4

NOTE: 1. Before inserting the floppy cable connector, make sure that all the pins of the **J8** BERG connector are straight and aligned vertically to the board. If they are not, then you should gently straighten the bent pins using needle-nosed pliers.

2. If you have a floppy controller on any adapter card(s), disable them completely following the adapter card's manual(s). Otherwise, the motherboard floppy controller will not function properly.

1.5 Installing Adapter cards (EISA or ISA)

The AMI 486 Enterprise-II provides full compatibility with all IBM XT or AT compatible adapter cards. It will also take 16 or 32-bit EISA adapter cards. The AMI 486 Enterprise-II is comprised of 7 EISA slots and 1 8-bit ISA (XT compatible) slot. The slots are numbered on the motherboard from **SLOT 1** through **SLOT 8**. (Refer to Figure 1-1). The EISA slots can accept 8/16 bit ISA (XT or AT compatible) or 16/32 bit EISA adapter cards. The slots are described below:

SLOT 1-2 EISA MASTER slot (Accepts any EISA/ISA adapter).

SLOT 3 8-bit ISA slot used for optional Enterprise memory expansion.

SLOT 4-7 EISA MASTER slot (Accepts any EISA/ISA adapter).

SLOT 8 EISA NONMASTER slot. This slot accepts only adapter cards which do NOT have **EISA Bus Mastering** capability.

You may notice that EISA adapter cards have longer and denser fingers on the edge connectors than ISA adapter cards. The EISA slots on the motherboard have two rows of contacts, one below the other. The ISA slot can be inserted into the EISA connector only far enough to make contact with the upper row of contacts. EISA adapters have longer fingers to make contact with the second row of contacts.

NOTE: When installing EISA adapter cards, make sure that they snap in **twice** and are fully seated into the EISA slot. If the card makes contact only with the upper row of contacts, the card will not function properly.

THIS PAGE INTENTIONALLY

LEFT BLANK

2.1 Initial Power-Up Checklist

1) [ ] Visually confirm that all connectors are properly seated.

2) [ ] Visually confirm that all cards are properly seated.

3) [ ] Visually confirm that no loose screws or foreign material are present on motherboard.

2.2 Initial Power-Up

After you have completed the Initial Power-Up Checklist, you are ready to power-up.

CAUTION

We recommend you plug your system into a multi-outlet surge-protected power strip. The strip will provide some protection against spikes to your system in the event of a power surge. During a lightning storm it is advisable to either unplug your system or use a UPS (uninterruptable power supply).

After plugging in the power cord, switch on the monitor and set the brightness and contrast to full. Allow the monitor to warm up for a few minutes and turn the system power switch on. Once the monitor has warmed up, you should see the following message on the screen:

AMI ENTERPRISE BIOS (C)1990 American Megatrends Inc.

▒▒▒▒ KB OK, ▒▒▒▒ EXTERNAL CACHE

Press <ESC> to bypass MEMORY test

(C) American Megatrends Inc.,

EDAMI-▒▒▒▒-▒▒▒▒▒▒-K▒

The following conditions may exist at power up and the initial screen during power up may vary according to the particular conditions.

An error message will be displayed if:

1. The Video Display Adapter used in the system is other than the standard Monochrome or Color Graphics board. In this case, with some display adapter cards, the Video Display ROM will display a message on the screen.

2. The Video Display Monitor is not correct for the video adapter. (e.g, connecting Color Graphics Monitor with Monochrome Display Adapter card).

3. One or more of the following errors may occur with the AMI 486 Enterprise II motherboard or the display adapter card. The BIOS will inform the user of the problem either through error beeps emitted by the speaker or an error message displayed on the monitor display screen if the video adapter card is functional. These errors are fatal errors and the system ROM BIOS will halt the boot-up procedure and display the message SYSTEM HALTED. The following is a list of fatal error conditions that the BIOS may encounter:

   a. KB CONTROLLER ERROR
   b. CMOS INOPERATIONAL
   c. 8042 GATE-A20 ERROR
   d. INVALID SWITCH/ MEMORY FAILURE
   e. DMA #1 ERROR
   f. DMA #2 ERROR
   g. DMA ERROR
   h. INTR #1 ERROR
   I. NO ROM BASIC

2.3 Memory Test

The BIOS performs a memory diagnostics test and displays the size of the memory on the second line of the screen. You can bypass the memory test by pressing the <ESC> key. On occasion, you may wish to bypass this test if there is a large amount of memory installed on the system. The memory test is not performed when a soft reboot is executed through the keyboard or a software program.

2.4 Cache Test

The BIOS also performs a cache memory diagnostic test and displays the size and status of the cache memory on the screen. This display is also on the second line after the memory size display. The size of the cache memory is 128 KB. If the cache memory is found to be faulty, the BIOS displays the following message:

CACHE MEMORY BAD - DO NOT ENABLE CACHE

After testing the memory and cache, the BIOS continues to initialize the peripherals using the SETUP information stored in the SYSTEM CMOS RAM. The following errors may occur during initialization of the peripherals:

a. CH-2 timer error
b. Keyboard error
c. KB/Interface error
d. INTR #2 error
e. Display switch not proper
f. Keyboard is locked ... Unlock it
g. FDD controller failure
h. HDD controller failure
i. C: drive error
j. D: drive error
k. D: drive failure

If one of the above error occurs, you will be prompted to "Press <F1> to RESUME" to allow you review the error messages. After the <F1> key is pressed, the BIOS will attempt to boot from the bootable device. If you wish to modify or check the setup, you must reboot and press the <DEL> key to run the SETUP program.

2.5 Test for AMI Module Presence Autodetect

After power-on, the BIOS disables the AMI module whether the module has been installed or not. The BIOS then detects whether a Floppy Disk controller, a WD1003 compatible HD Controller, or Serial/Parallel ports have been installed in the I/O slots. It then enables the controllers or ports in the AMI module so that there is no conflict. For example, if the BIOS detects a serial port on the I/O slot then it will program the two serial ports on the AMI module as serial port 2 and serial port 3.

2.6 Run System Setup (SETUP) Utility

The BIOS will ask you to RUN SETUP UTILITY when one of the following conditions exist:

a. CMOS battery state low
b. CMOS system options not set
c. CMOS checksum failure
d. CMOS memory size mismatch
e. CMOS time & date not set
f. CMOS display type mismatch
g. C:drive failure

If any of these errors are encountered by the BIOS, the following message will appear on the display:

RUN SETUP UTILITY
Press <F1> to RESUME

in which case pressing <F1> will give you the following options:

EXIT FOR BOOT
RUN CMOS SETUP
RUN DIAGNOSTICS

NOTE: For any of the errors mentioned above, it is recommended that you choose the option **RUN CMOS SETUP;**, otherwise, the system's performance may become erratic.

If you choose the option **EXIT FOR BOOT** the system will attempt to reboot from any (e.g, FLOPPY, HARD DISK) device that the **CMOS SETUP** recognizes as bootable.

Choosing **RUN CMOS SETUP** will take you through the SETUP procedure discussed in sections 2.5 through 2.8. Choosing **RUN DIAGNOSTICS** will take you to the diagnostic screen and the options which are discussed in Sections 4.

2.7 Summary of SETUP Screen

The Setup program allows you to set:

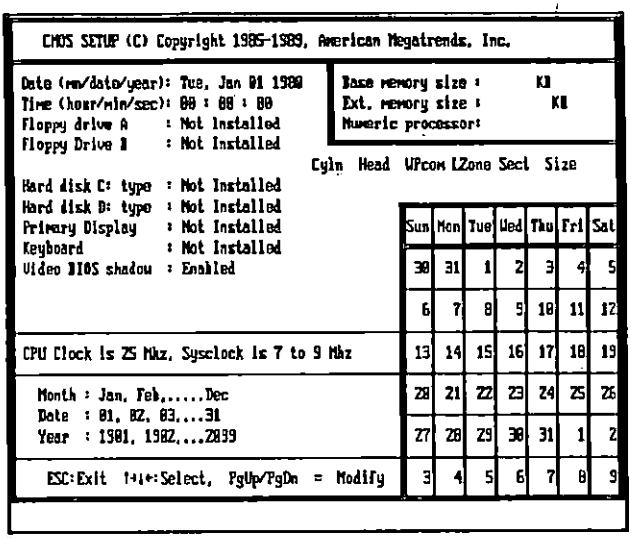
a) Date
b) Time
c) Floppy drive A:
d) Floppy drive B:
e) Hard Disk C: type
f) Hard Disk D: type
g) Primary display
h) Keyboard
i) Video BIOS shadow
j) Emulated CPU speed

The Setup procedure automatically detects the following:

a) Base memory size
b) Extended memory size
c) Presence of Weitek Coprocessor.

2.8 SETUP Screen Display

The following section will assist you in answering the questions asked by the BIOS SETUP program. The SETUP screen is shown in figure 2-1. The SETUP program is user-friendly and has a HELP window at the bottom left corner of the screen. The HELP window is displayed in reverse video (black characters in white background). At the very bottom left of the screen, the key conventions used to modify the information are displayed. The <PgUp> and <PgDn> keys are used to change or modify an option. The arrow keys are used to select the option you want to modify or change. Press the <ESC> key to quit the system SETUP.


CMOS SETUP (C) Copyright 1985-1989, American Megatrends, Inc.
Date (mn/date/year): Tue, Jan 01 1990
Time (hour/min/sec): 00 : 00 : 00
Floppy drive A : Not Installed
Floppy Drive B : Not Installed
Hard disk C: type : Not Installed
Hard disk D: type : Not Installed
Primary Display : Not Installed
Keyboard : Not Installed
Video BIOS shadow : Enabled
Base memory size : KB
Ext. memory size : KB
Numeric processor:
Cyln Head WPcom LZone Sect Size
CPU Clock is 25 Mhz, Sysclock is 7 to 9 Mhz
Month : Jan, Feb,.....Dec
Date : 01, 02, 03,....31
Year : 1901, 1902,....2099
ESC:Exit ↑↓←→:Select, PgUp/PgDn = Modify
Sun Mon Tue Wed Thu Fri Sat
30 31 1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31 1 2
3 4 5 6 7 8 9

Initial CMOS Setup Screen
Figure 2-1

Date Setup

The screen displays:

Date (mn/date/year): Tue, Jan 01, 1990

The help window displays:

Month : Jan, Feb,.....Dec
Date : 01, 02, 02,...31
Year : 1901, 1902,...2099

To change the highlighted portion of the date, use the <PgUp> and <PgDn> keys. Use the **Left** and **Right** arrow keys to move the highlight from the **month**, to the **date**, to the **year.**

Time Setup

The screen displays:

Time (hour/min/sec): 00: 00: 00

The help window displays:

Time is 24 hour format:-
Hour:(00-23), Minute:(00-59), Second:(00-59)
(1:30 AM = 01:30:00), (1:30 PM = 13:30:00)

To change the highlighted portion of the time, use the <PgUp> and <PgDn> keys. Use the **Left** and **Right** arrow keys to move from the **hour**, to the **minute**, and to **seconds**.

Floppy drive A: Setup

The screen displays:

Floppy drive A: : Not Installed

The help window displays:

Options:-
360 KB 5¼", 1.2 MB 5¼",
720 KB 3½", 1.44 MB 3½", Not Installed

To change drive A:, use the <PgUp> and <PgDn> keys.

Floppy drive B: Setup

The screen displays:

Floppy drive B: : Not Installed

The help window displays:

Options:-
360 KB 5¼", 1.2 MB 5¼",
720 KB 3½", 1.44 MB 3½", Not Installed

To change drive B:, use the <PgUp> and <PgDn> keys.

Hard disk C: Setup

The screen displays:

Hard disk C: type : Not Installed

The help window displays:

FIXED type = 01...46, USER defined type = 47,
For type 47 Enter: Cyln,Head,WPcom, LZone,Sec,
(WPcom is 0 for ALL, 65535 for NONE)

To change disk C: type, use the <PgUp> and <PgDn> keys. The information Cyln, Head, WPcom, LZone, Sec, and Size will be displayed for each disk type. A complete table of hard drive types is given in Appendix A of this manual.

Hard disk D: Setup

The screen displays:

Hard disk D: type : Not Installed

The help window displays:

FIXED type = 01...46, USER defined type = 47,
For type 47 Enter: Cyln,Head,WPcom, LZone,Sec,
(WPcom is 0 for ALL, 65535 for NONE)

To change disk D: use the same procedure as disk C:. Again, all disk information will be displayed for each type disk and a complete list of hard drive types may be found in Appendix A.

Primary display Setup

The screen displays:

Primary display : Not Installed

The help window displays:

Options:-
Monochrome, Color 40x25,
VGA or EGA, Color 80x25, Not Installed

To change the Primary display, use the <PgUp> and <PgDn> keys.

Keyboard Setup

The screen displays:

Keyboard : Not Installed

The help window displays:

Options:-
Installed : Test Keyboard
Not Installed : Do not test keyboard

To change the keyboard option, use the <PgUp> and <PgDn> keys.

Video BIOS shadow Setup

The screen displays:

Video BIOS shadow : Enabled

The help window displays:

Options:-
Enabled : Shadow RAM ON
Disabled : Shadow RAM OFF

Initially the BIOS enables the Shadow RAM feature. It enables the RAM to shadow the ROM of video display adapters which have their video driver routines kept inside the adapter ROM. Since the AT slots run at speeds much slower than the CPU, the performance of the system gets affected if the video drivers are executed from the ROM. To improve performance, the video drivers in ROM are copied to motherboard memory and executed from there. This concept is called Shadow RAM.

To change the Video BIOS shadow option, use the <PgUp> and <PgDn> keys.

Emulated CPU speed Setup

The screen displays:

Emulated CPU speed : 8

The help window displays:

Options:-
Equivalent to IBM AT running at
8, 10, 12, 16, 20, 25, 33, 40 Mhz

This option allows you to set the low speed of operation.

To change the Emulated CPU speed option, use the <PgUp> and <PgDn> keys.

Exiting Setup

After you review all information on the Setup display and are sure it is correct, press the <ESC> key. The help window will display the following message:

Write data into CMOS and exit (Y/N)?

You must press <ENTER> after you select Y or N. If you select <N> the cursor will jump back to the Emulated CPU speed option at which time you can modify any option. If you enter <Y> the screen will clear and a **HARD BOOT** will take place.

2.9 Errors Reported by BIOS

The BIOS performs various diagnostic tests at the time the system is powered up. Whenever an error is encountered during these tests, you will either hear a few short beeps or see an error message displayed on the screen. If the error occurs before the display device is initialized, the system reports the error by a number of short beeps.

In the case of fatal errors, the system halts after reporting the error either through the audio speaker or video display screen. For non-fatal errors, the BIOS reports the error and the boot-up process continues.

Errors Heard Through AUDIO Speaker

Beep Count	Meaning
1	DRAM refresh failure .
2	Parity Circuit failure.
3	Base 64KB RAM failure.
4	System Timer failure.
5	Processor Failure.
6	Keyboard Controller - Gate A20 error.
7	Virtual Mode Exception Error.
8	Display Memory R/W Test Failure.
9	ROM-BIOS CheckSum Failure.

NOTE : With the exception of error 8, all errors above are fatal.

Fatal Errors Through VIDEO Display Device

1. KB CONTROLLER ERROR
2. CMOS INOPERATIONAL
3. 8042 GATE-A20 ERROR
4. INVALID SWITCH/MEMORY ERROR
5. DMA #1 ERROR
6. DMA #2 ERROR
7. DMA ERROR
8. INTR #1 ERROR
9. NO ROM BASIC

Non-Fatal Errors Through VIDEO Display Device

1. CH-2 timer error
2. Keyboard error
3. KB/Interface error
4. INTR #1 error
5. INTR #2 error
6. Display switch not proper
7. Keyboard is locked ... Unlock it
8. FDD controller failure
9. HDD controller failure
10. C:drive error
11. D:drive error
12. D:drive failure
13. CMOS battery state low
14. CMOS system options not set
15. CMOS checksum failure
16. CMOS memory size mismatch
17. CMOS time & date not set
18. CMOS display type mismatch
19. C:drive failure

2.10 User Selectable Options Through Keyboard

This section describes the options available to the user in the SYSTEM BIOS during boot-up.

Key Sequence	BIOS Function
<ESC>	Press this key to bypass system memory test.
<DEL>	Press this key to run System SETUP program.
<INS>	With some EGA/VGA cards with the video RAM shadow feature enabled, there may be no display on the screen after the system is powered on. If this happens, switch off the System and switch it back on again with <INS> key pressed on the keyboard. This will cause the BIOS to let the user run the SETUP program again so that the Video RAM shadow feature can be disabled.
<CTRL><ALT><+>	This key sequence sets the system to high speed of operation (25 or 33 MHz) with cache memory enabled for maximum system throughput. The cursor changes to a block to indicate the change.

<CTRL> <ALT> <-> This key sequence allows sets the system to low speed (selected in Setup Emulated CPU speed option). A double line cursor indicates the switch.

<CTRL> <ALT> <SHIFT> <+>
This key sequence enables the external cache memory to maximize system throughput at high speed of operation.

<CTRL> <ALT> <SHIFT> <->
This key sequence disables the external cache memory to reduce system throughput.

<CTRL> <ALT> <DEL>
This key sequence is called SOFT RESET. When this key sequence is pressed, the system reboots.

PAGE
INTENTIONALLY
LEFT BLANK

Section 3
SYSTEM OVERVIEW

The AMI ENTERPRISE-II, which uses very large scale integration (VLSI) technology, is an IBM AT-compatible motherboard, approximately 13.8 by 12 inches (identical in size to a standard IBM AT motherboard with identical mounting hole locations).

The AMI ENTERPRISE-II has the following features:

* Microprocessor : Intel 80486

* Processor Clock Speed: High or Low

  High clock speed : Set at time of manufacturing to 25 MHz or 33 MHz

  Low clock speed : User definable, through BIOS Setup, to emulate a CPU clock speed equivalent to 8/10/12/16/20/25/33/40 MHz

  Method of Speed Selection: Using turbo switch or through keyboard

* Cache Memory

  External cache memory size: 128 KB

  Cache Type: Direct Mapped, Write-through

  Memory cached: Full amount of system memory

  Cache read wait state: 0 Wait state

  Burst mode support: Yes

Cache enable/disable: Through keyboard

* Main memory

On-board memory: Up to 32 MB

Off-board memory: Up to 64 MB more (on AMI 32 bit memory expansion slot), for a total of 96 MB. Up to 4 gigabytes (on EISA expansion bus)

DRAM Type: 1Mx9 or 4Mx9, Fast Page Mode Single-in-line Memory Module.

DRAM Speed: 70 nsec (RAS access time), fast page mode at 25 & 33 MHz

* Shadow RAM

System BIOS: Always shadowed

C800 BIOS: Shadowed according to user's needs, through BIOS Setup

Video BIOS: Shadowed according to user's needs, through BIOS Setup

* BIOS

Manufacturer: AMI

Built-in setup: Yes

Built-in diagnostics: Yes

User definable hard drive : Yes

Video/keyboard/disk drive bypass option: Yes

* CMOS Memory

  - 8 KB of nonvolatile SRAM with built-in battery backup for EISA Automatic configuration

  - Real-time-clock + 64 bytes of RAM with built-in battery backup for normal (ISA) setup

* Optional WEITEK 4167 Numeric Coprocessor Socket

* 82357 Integrated System Peripheral

  - 7 Channel Direct Memory Access (DMA) (Any DMA channel may be programmed for 8, 16, or 32 bit DMA device size and ISA compatible, type A, type B, or burst type C modes)

  - 15 level interrupt:

Priority	Label	Typical Interrupt Source
1	IRQ0	Interval Timer 1, Counter 0 OUT
2	IRQ1	Keyboard
3-10	IRQ2	Used Internally for IRQ8 through IRQ15
3	IRQ8#	Real-Time-Clock
4	IRQ9	EISA bus
5	IRQ10	EISA bus
6	IRQ11	EISA bus
7	IRQ12	EISA bus
8	IRQ13	Coprocessor Error
9	IRQ14	EISA bus (Hard disk drive controller)
10	IRQ15	EISA bus
11	IRQ3	EISA bus (Serial Port 2)
12	IRQ4	EISA bus (Serial Port 1)

13	IRQ5	EISA bus (Parallel Port 2)
14	IRQ6	EISA bus and Floppy disk controller
15	IRQ7	EISA bus (Parallel Port 1)

- Non-Maskable-Interrupt (NMI) generation/ control
- Five programmable 16-bit counter/timers
- System Arbiter
- Refresh Generation

* I/O capability

Support for accessing 32/16/8 bit memory devices and 32/16/8 bit I/O devices on the EISA bus.

* EISA Bus

System clock: EISA bus clock (bclk) is 8.33 MHz with a 25 MHz CPU (CPU clock divided by 3) and 8.25 MHz with a 33 MHz CPU (CPU clock divided by 4).

* I/O Slots

1 32-bit: **AMI proprietary memory card slot**

7 32-bit: **EISA Bus slots** (Fully compatible with IBM AT expansion cards)

1 8-bit: **IBM XT-compatible** (If memory slot is used, this slot cannot be used)

* I/O Address Space

  x100 (hex) through x3FF (hex) for ISA compatible I/O
  (x = a "don't care" character which does not affect mapping location. For example, for I/O port addresses 0100H, 1100H, 2100H, etc., map to same location.)

  s000 (hex) through s0FF (hex) for EISA expansion slot
  s400 (hex) through s4FF (hex) for EISA expansion slot
  s800 (hex) through s8FF (hex) for EISA expansion slot
  sC00 (hex) through sCFF (hex) for EISA expansion slot

  (s = EISA bus slot number, s = 0 for system board)

* 32-bit memory addresses to access 4 gigabytes of memory address space on the EISA expansion slots.

* 'I/O channel check' to generate NMI
* I/O wait state generation

* Open-bus structure (allowing multiple microprocessors to share the system's resources, including memory)

* Refresh of system memory from channel microprocessors

* Keyboard

  - 5 pin IBM compatible DIN connector

  - Keyboard lock to prevent unauthorized access (not supported at present time)

* Mouse

  - 6 pin IBM PS/2 compatible mini-DIN connector

* Audio Speaker Attachment

* Floppy Disk Controller

* AMI BUS for AMI Module containing two (2) serial, one (1) parallel and IDE Interface.

Section 4
ADVANCED ROM DIAGNOSTICS

The AMI 486 Enterprise-II System BIOS has a built-in Advanced Diagnostics program which has several diagnostics features for the various hardware components of the system in the following areas:

* Hard disk
* Diskette drives
* Keyboard
* Video
* Printer and Communication ports

4.1 Selecting the Various Advanced Diagnostics Options

How to Access Advanced Diagnostics

When you power-up the system, press the <DEL> key on the keyboard when you see the following message:

Press <DEL> if you want to run SETUP or DIAGS

If the <DEL> key is depressed, the following message will be displayed after the BIOS initializes:

EXIT FOR BOOT
RUN CMOS SETUP
RUN DIAGNOSTICS

Use the arrow keys <↓> <↑> to select the desired option (which will be displayed in reverse video) and press the <Enter> or <Return> key.

4.2 Diagnostics Menu

Note the following in the Diagnostics Opening Menu:

* The **Guide Line** in Reverse Video specifying the usage of the Cursor Keys, <ENTER> & <ESC> key.

* The Configuration of the system in the **Devices Present** box.

* The **Real Time Clock** ticking away at the right hand top corner of the screen.

* **Diagnostics Options Line** - Hard Disk, Floppy, Keyboard, Video & Miscellaneous Diagnostics.

* **Hard Disk Diagnostics Options Window** detailing the various hard disk diagnostics which are available.

* Note that the **Block Cursor** is on the Hard Disk & the first option under hard disk diagnostics - Hard Disk Format.

Key Conventions

* Use the Left & Right arrow keys to move in the Diagnostics Options Line.

* Use the Up & Down arrow keys to move within a Diagnostics Options Window.

* Use the <ENTER> key to select the option in the Diagnostics Options Window.

* Use <ESC> key to abort & return to previous menu.

Diagnostics Options Window

The individual diagnostics option window is as follows:

* Hard Disk
* Floppy Disk Drive
* Keyboard
* Video
* Miscellaneous

4.3 Hard Disk Diagnostics

Using Hard Disk Diagnostics Options

The Hard Disk options discussed below fall into two categories:

* **Destructive Operation** - The data on the Hard Disk is lost.
* **Non-destructive Operation** - The data on the Hard Disk is undisturbed.

The list below gives the various Hard Disk Options & the category they fall into.

* Hard Disk Format	-	Destructive Operation.
* Auto Interleave	-	Destructive Operation.
* Media Analysis	-	Destructive Operation.
* Performance Test	-	Non-destructive Operation.
* Seek Test	-	Non-destructive Operation.
* Read/Verify Test	-	Non-destructive Operation.
* Check Test Cylinder	-	Data on the Test Cylinder alone is lost.

All the options under Hard Disk Diagnostics include the following parameters:

* Disk Drive
* Drive Type
* Interleave Factor
* Bad Track List
* Start Cylinder
* End Cylinder
* Start Head
* End Head

Drive Name

Enter the Hard disk drive on which you want the diagnostics function to be performed. The default value for this parameter is normally the designated drive entered the last time the test was performed. However, in case of a single drive system, the disk drive for the operation is assumed to be the physical drive actually present in your system. For example, if the drive is connected as physical drive "D", this parameter will be assumed as "D".

Drive Type Definition

The default value for the drive type is the value set during the CMOS setup. However, if the drive was not set during CMOS Setup, this value defaults to 1 and the user has the option of setting the drive to one of the 46 standard Disk drive types listed in Appendix A.

If your disk drive type is not one of the 46 standard disk types, use the **USER** option to define your own parameters for the drive. When defining a USER drive type, the following parameters will be needed:

Number of Cylinders
Number of Heads
Number of Sectors per track
Write precom Cylinder number
Landing zone

NOTE: The **USER** definition is valid only as long as the Diagnostics is in effect. This feature is provided for you to test a disk drive, the definition for which is not available in the ROM.

Interleave Factor

Choose an optimum interleave factor. Use the Auto-Interleave option if you are in doubt.

The default value for the interleave factor is 3.

Mark Bad Tracks

The manufacture usually includes a list of bad tracks, if any, for the hard disk drive. If you have such a list, answer <Y> to this prompt.

A menu will then be displayed which allows you to edit the complete bad track list. You can exit Bad track entry by hitting the **<ESC>** key or selecting the **Save and Exit** option.

The default for this prompt is <N>.

Start and End Cylinder Number

Enter the Start and End Cylinder Number here. The default values for the start and end cylinder numbers are 0 and the maximum number of cylinders respectively.

Start and End Head Number

Enter the Start and End head numbers here. The default values for the Start and End heads are 0 and the value of the maximum head numbers respectively.

Proceed

If all the entries are correct, press <Y>, or press <N> to edit the entries. The default is <N>.

Warning

For each destructive operation, a WARNING message will be displayed prompting you to continue or abort. You may proceed with the operation if you are absolutely sure about the information you have entered and you really want to perform the operation.

Activity Screen

While performing any operation, the BIOS displays a small window at the right hand top corner of the screen called the activity window. Depending upon the type of operation, the activity window will have different information displayed in it.

Hard Disk Format Option

This option allows you to preformat the hard disk for use by DOS or any other operating system. This option can be used in one of the following circumstances:

- To integrate a new hard disk to the system.
- To reformat a used hard disk which has developed some bad patches due to aging or mishandling.

NOTE: The **hard disk format** option is a destructive operation. You will lose all the data on the drive. If you want to retain your data on a used hard disk, make a backup before you start the operation.

Auto Interleave Option

This is a very powerful feature. It enables you to get peak performance from your hard disk.

This feature automatically finds the optimum interleave value. The BIOS will then begin formatting the hard disk with the optimum interleave factor. However, if you need to enter the bad track list, you must stop the formatting after if finds the optimum interleave factor by pressing the <ESC> key. You can then go into the Format option and use the optimum interleave factor and format the hard disk.

NOTE: **The Auto Interleave Option** is a destructive operation. You will lose all the data you may have on the hard disk. If you want to retain the data on a used hard disk, make sure to backup your hard disk before you start the operation.

Media Analysis Option

This is the most important operation for your hard disk drive. This diagnostics function does a series of tests on the hard disks to find any bad patches on the hard disk. Even though manufacturers give a list of bad tracks with each hard disk, many times new bad patches are introduced due to aging or mishandling of the drive. This procedure finds all possible bad tracks on the hard disk and marks them as bad. This operation takes quite some time to run; for best results this test should run uninterrupted.

NOTE: The **Media Analysis** option is a destructive operation. You will lose all the data stored on your hard disk. If you want to retain data on a used hard disk, please make sure that you have made a complete backup of your hard disk.

Performance Test

This test enables the user to check disk performance. The critical factor in deciding disk performance is the Interleave Factor and changing this factor can bring about drastic changes in performance.

This test determines the data transfer rate and the track to track seek time. Data transfer rate is measured in units of Kilobytes/Second and the track to track seek time in milliseconds. Higher values for data transfer rates imply a better disk performance & lower values of track to track seek time indicate a better disk.

Seek Test

This test checks the seek capability of the hard disk on the specified cylinder and head range. First a sequential seek is performed, and then a random seek is performed. Any errors during the test are displayed on the screen.

Read/Verify Test

This test performs sequential & random read & verify operation on the specified cylinder and head range.

Force Bad Tracks

This operation enables an user to define a set of tracks as bad. Certain specific applications require this option.

4.4 Floppy Diagnostics

All the options under floppy diagnostics require the following parameters:

* Drive No.
* Start Track No.
* End Track No.

The list below gives the effect of each of the diskette tests:

Diskette Format	- Destructive
Speed Test	- Non Destructive
Random R/W Test	- Destructive
Sequential R/W Test	- Destructive
Disk Change Line Test	- Non Destructive

Diskette Format

This test allows the user to check the Floppy controller's abilities to format a diskette. Note that this is only a test to check the format function of the controller. The diskettes formatted with this option do not have the file structure to hold files. These diskettes must be formatted again under the operating system if you intend to use them for files.

Drive Speed Test

This test determines the rotation speed of the drive. The following are the allowable speeds for the various drives:

* 1.2 MB drive -360 rpm for a 1.2 MB diskette
  -300 rpm for a 360 KB diskette
* 360 KB drive -300 rpm.
* 720 KB drive -300 rpm.

Allow for a tolerance of 1% on all the speeds. Format the diskette before performing this test.

Random Read/Write Test

This test performs a random read/write operation on the diskette and checks out the random seek, read and write capability of the drive. Format the diskette before performing this test.

Sequential Read/Write Test

This test performs a Sequential read/write operation & checks out the sequential seek, read & write capability of the drive. Format the diskette before performing this test.

Disk Change Line Test

This test checks the function of disk change line capabilities of the diskette drives. This test is valid only for drives with the disk change line feature (NOTE: This test requires a formatted diskette.)

- 1.2 Mb drive
- 720 Kb or 3 1/2" drive.

4.5 Keyboard Diagnostics

Scan / ASCII Code Test

When this option is chosen, a keyboard layout is shown on the screen. This keyboard layout might not correspond with your keyboard but will have all the keys you have on your keyboard.

The objective of this test is to determine whether the keys depressed match with their scan and ASCII codes. Every time a key is depressed, the scan code & the ASCII code of the key is shown.

Use <CTRL><BREAK> key to abort this test.

4.6 Video Diagnostics

Video diagnostics include the following for both Monochrome and Color display adapter cards:

* Sync Test	- Checks the Sync capability.
* Adapter Test	- Performs test on the Display Memory.

* Attribute Test	-	Checks the attributes of the Display
* 80 x 25 Display Test	-	Checks the 80 x 25 character set of the display adapter.

If you have a color display card and a color monitor, you will have the following additional diagnostics functions.

* 40 x 25 Display test
* 320 x 200 Graphics test
* 640 x 200 Graphics test
* Page selection test
* Color test

The Video diagnostics functions does not require any input from the user. Test results are displayed on the screen.

4.7 Miscellaneous Diagnostics

The following tests are included in this category:

* Serial Communication Port Test.
* Printer Port Test.

Serial Communication Port Test

This test requires a special RS-232C connector to be plugged into the port.

The attributes of this connector are:

* RD & TD Shorted.
* DSR & DTR Shorted.
* CTS & RTS Shorted.

This test checks the port for the following:

* Baud Rates
* 7 Bit / 8 Bit
* Odd / Even Parity

The results of the test are displayed on the screen.

Printer Port Test

This test sends a test pattern to the printer.

Section 5
INSTALLING MOTHERBOARD DRAM

Your AMI 486 ENTERPRISE-II motherboard memory system consists of two 32-bit Dynamic Random Access Memory (DRAM) memory banks. Both banks are designed to use Single in-line memory module (SIMM) DRAM's. Refer to Figure 1-1 IN Section 1 for memory bank location.

You may use 1Mx9 or 4Mx9 SIMM card's. All SIMM's must support Column address strobe (CAS) before Row address strobe (RAS) refresh and should have FAST PAGE MODE ACCESSING CAPABILITY.

5.1 Installing SIMM modules

In Figure 1-1 in Section 1, you will see that there are eight (8) SIMM sockets In the board. Four (4) of them are marked **BNK1** and the other four (4) are marked **BNK2**. To upgrade, you will need at least four (4) SIMM modules. Before you plan on installing new SIMM modules, first identify the following items:

What type of SIMM module?

The board supports the following types and combinations of SIMM modules:

BNK1 Type	BNK2 Type	Total Memory on-board
1M x 9	None	4 MB
1M x 9	1M x 9	8 MB
4M x 9	None	16 MB
4M x 9	4M x 9	32 MB

NOTE: Both **BNK1** and **BNK2** should be of the same type. If you have **BNK1** filled with 1M x 9 type SIMMs and you want to upgrade to 32 MB, then you must replace the 1M x 9 SIMMs with 4M x 9 SIMMs as well as install 4M x 9 SIMMs in **BNK2**.

What manufacturer and part number?

The SIMM modules you need to buy should be FAST PAGE and typically have **20 nanoseconds** CAS access time (tCAS = 20 ns). The RAS access time can be 70 or 80 nanoseconds (tRAS=70/80 ns). The table below gives some suggested manufacturer's part numbers.

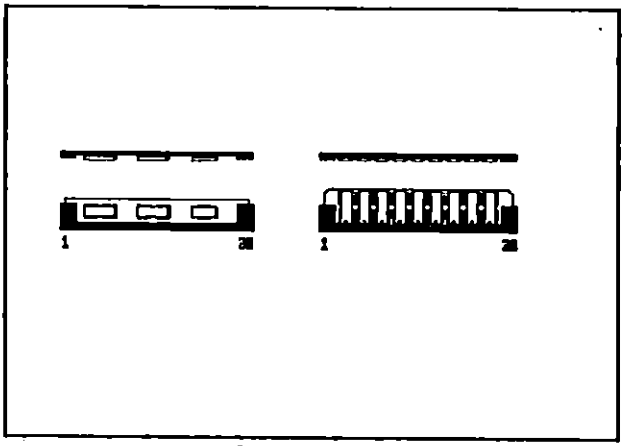
Type SIMM	Manufacturer	Part Number
1M x 9	Siemens	HYB511000AJ-70
	Toshiba	THM91000AS-70
	NEC	MC-421000A9-70
	Mitsubishi	MH1M09A0JA-70
	Fujitsu	MB85235-70
4M x 9	Toshiba	THM94000AS-70
		THM94000AS-80
	OKI	G44000EM9-70
	NEC	MC-424100A98-70

Once you have chosen which SIMM module to use, follow the procedure below for installation:

CAUTION

If your motherboard is installed in the system and you are adding memory, it is highly recommended that you remove the motherboard before attempting to install SIMM cards. The force required to insert the SIMM cards could cause the board to flex and damage could occur at the standoff areas.

Place the AMI 486 ENTERPRISE-II motherboard on a anti-static mat as outlined in the beginning of Section 1. Rotate the board until the keyboard connector (J7) is on the right side. This will place the SIMM area to your bottom right. With the component side of the SIMM facing you, firmly push the card into the socket at a 45° angle. Then raise the SIMM perpendicular (90°) to the motherboard. When properly inserted the SIMM card will "click" into place as the latching pins engage. Use Figure 5-1 as a reference to install the SIMM cards.



Installation of SIMM Cards
Figure 5-1

5.2 Testing SIMM memory

After the installation is complete, check the following steps to make sure that you installation is correct as you power on the system:

1. **Is the system showing the correct amount of memory when it displays memory size?** The system should count total amount of memory according to the table below **if you do not have any other memory card installed in the system.**

BNK1 Type	BNK2 Type	Total Memory Shown
1M x 9	None	3712 KB OK
1M x 9	1M x 9	7808 KB OK
4M x 9	None	16000 KB OK
4M x 9	4M x 9	32384 KB OK

2. **Check the boot-up configuration screen.** The boot-up configuration screen shows what memory the system has detected. It will show the following if you have filled up **BNK1** and **BNK2** with 4M x 9 SIMMs.

Memory	Type	Used As
BANK1	4M x 9	4M x 9
BANK2	4M x 9	4M x 9

If steps 1 and 2 fail, follow the memory installation procedure again and repeat the memory test procedure again. If it still fails then either the SIMM module(s) is/are defective or there is something wrong with the motherboard. Call your local distributor for assistance.

THIS PAGE INTENTIONALLY

LEFT BLANK

Section 6
INSTALLING A MEMORY CARD

Your AMI 486 Enterprise-II motherboard is able to support up to 32 MB of memory using SIMM sockets on the board. The AMI 32-bit Memory card may be installed to increase the size of 32-bit system memory in your computer.

NOTE

Both SIMM banks on the AMI 486 Enterprise-II motherboard must be filled before installing the AMI 32-bit Memory card.

To upgrade memory using the 32-bit slot (J20/21), AMI offers a memory card with a capacity of 64 MB. The card uses 1M X 9 or 4M X 9 SIMM modules. The card will be referred to as the 32-bit Memory Card in this manual. The card has four 32-bit memory banks (each bank uses 4 SIMMs). You may populate as many banks as you wish. All banks must use the same type of SIMM's. For example, if BANK1 is populated with 1M X 9 SIMM's, then ALL the remaining banks must be upgraded with 1M X 9 type SIMM's.

NOTE

The SIMM banks on the AMI 486 Enterprise-II motherboard have been marked BNK1 and BNK2. The SIMM banks on the 32-bit Memory card have been marked BANK3, BANK4, BANK5 and BANK6.

6.1 To order a 32-bit Memory Card for Memory Upgrade

When you are ready to order your 32-bit memory card, have the following information available:

1. Serial number of the AMI 486 Enterprise-II motherboard and the "ECN #" (located on a small white sticker near the serial number).

2. Clock Frequency of the system. (e.g. 25 or 33 MHz)

6.2 Unpacking the AMI 32-bit Memory Card

The 32-bit Memory board you receive will be packed in an anti-static bag and sandwiched between two sheets of sponge. Follow the instructions in Section 1.1 for proper handling of the board and to avoid static electricity hazards. After you have unpacked the board, check and note down the following points to ensure correct installation and for future reference and upgrades.

NOTE: The dip switch "SW" located on the memory board has no effect when installed in the AMI 486 Enterprise-II motherboard.

6.3 Installation of SIMM's on 32-bit Memory card

Table 6.3.1 shows the total memory for all possible combinations of memory on the motherboard (BANK 1 and BANK2) and the memory card (BANK 1, BANK 2, BANK 3, and BANK 4).

Motherboard		32-Bit Memory Card				Total
BANK1	BANK2	BANK3	BANK4	BANK5	BANK6	RAM
1M	1M	1M	--	--	--	12M
1M	1M	1M	1M	--	--	16M
1M	1M	1M	1M	1M	--	20M
1M	1M	1M	1M	1M	1M	24M
1M	1M	4M	--	--	--	24M
1M	1M	4M	4M	--	--	40M
1M	1M	4M	4M	4M	--	56M
1M	1M	4M	4M	4M	4M	72M
4M	4M	1M	--	--	--	36M
4M	4M	1M	1M	--	--	40M
4M	4M	1M	1M	1M	--	44M
4M	4M	1M	1M	1M	1M	48M
4M	4M	4M	--	--	--	48M
4M	4M	4M	4M	--	--	64M
4M	4M	4M	4M	4M	--	80M
4M	4M	4M	4M	4M	4M	96M

6.4 Installation of 32-bit Memory card

1. Gently press all the socketed components on the card to make sure they are properly seated.

2. The card has two edge connectors: one 62-pin and one 132-pin. The 62-pin connects to J20 and the 132-pin connects to J21 on the AMI 486 Enterprise-II motherboard. The card has a card guide mounted on one end. Hold the board firmly and gently press it vertically all the way into the slots of the motherboard. Push the board firmly to ensure good contact. Install a screw in the card guide end screw slot and tighten to the chassis.

3. You are now ready to switch on the system power. Table 6.4.1 shows how much of the total RAM is available to the user (384 KB are reserved for shadowing and other purposes). When the system boots, a RAM test is performed and the amount of RAM is shown at the top left of the screen. This table will indicate the amount of RAM which should be displayed in this message.

TABLE 6.4.1

TOTAL RAM

INSTALLED	AVAILABLE
4M	3712 KB
8M	7808 KB
12M	11904 KB
16M	16000 KB
20M	20096 KB
24M	24192 KB
32M	32384 KB
36M	36480 KB
40M	40576 KB
44M	44672 KB
48M	48768 KB
56M	56960 KB
64M	65152 KB
72M	73344 KB
80M	81536 KB
96M	97920 KB

Also check the configuration screen. For example, if you have BNK1 and BNK2 filled with 1M x 9 SIMMs and memory board BANK3 filled with 4M x 9 SIMMs, then the configuration screen would show:

Memory	Type	Used As
BANK1	1M x 9	1M x 9
BANK2	1M x 9	1M x 9
BANK3	4M x 9	4M x 9
BANK4	Absent	
BANK5	Absent	
BANK6	Absent	

If you buy the AMI 32-bit memory card only partially filled (e.g., only BANK3 filled with 1M x 9 SIMMs) and later you want to increase the amount of memory on your system, then you will have to populate empty SIMM sockets on the motherboard according to your needs. **To upgrade the memory, you must have at least 4 SIMM modules.** Refer to Section 6.1 to determine your configuration and follow the steps in Section 5.1 for installation.

NOTE: The AMI 32-bit memory card requires the same SIMM modules as the motherboard. The suggested manufacturer's part numbers are given in Section 5.1.

After the required SIMM modules are installed, check the total amount of memory reported by the system during power-on and on the configuration screen and compare it to the figures in table 6.4.1.

THIS PAGE INTENTIONALLY

LEFT BLANK

Section 7
INSTALLING A WEITEK COPROCESSOR

This section describes the procedure to install a Weitek 4167. The table gives a listing of suggested devices for different clock frequencies.

Board Frequency	Component part number
25MHz	WTK4167-025
33MHz	WTK4167-033

7.1 Installing the WEITEK 4167 coprocessor

Locate U89 on the motherboard. With the keyboard connector J7 to your right, it is the empty 144 pin PGA socket located below the memory slot (J21) and to the left of the Intel 80486 CPU. "WTK4167" is etched adjacent to the socket. Pin 1 on the motherboard is marked by a white diagonal line cutting the one corner of the square etched on the motherboard.

Align the pins and press the Weitek coprocessor firmly into the socket, making sure that pin 1 of the Weitek coprocessor is aligned with pin 1 of the socket U89. Again take every precaution to avoid electrostatic discharge by following the procedures in Section 1.

Turn on the system. Press <DEL> to go to the CMOS Set-up screen. (Refer to Section 2 on the set-up screen). In the upper right corner box you should get the following message:

Numeric Processor: Installed, Weitek.

If this message is displayed, the system has detected the Weitek Coprocessor and you may assume that the installation process is complete. (NOTE: The installed is the on-board coprocessor in the 486.)

If the system is unable to detect the Weitek Coprocessor, you will get the following message on the set-up screen:

Numeric Processor: Installed

Note that there is no reference to "Weitek" in the message.

Go through the installation procedure once again. Switch off the power, check the orientation of Weitek 4167, press the chip firmly to make sure that it is making good contact, then bring the system up again. If you still get the same result, call AMI's technical support department. We will be happy to help you.

SERIES-31 AMI MODULE

The Series 31-AMI Module, currently supported by the AMI 486 Enterprise-II motherboard and the Voyager-II motherboard, allows you to add the following options economically without using one of your I/O slots. Currently, only one module is available; however, more modules with additional options may be available in the future. The options currently provided by the AMI module are:

IDE disk interface
Floppy controller
2 serial ports
1 parallel port

The AMI module design is based on C & T 's 82c711 Universal peripheral Controller II, in a 100 pin PQFP package.

8.1 To Order the AMI Module

When you are ready to order the AMI module, please have the following information available:

1. Serial Number of the AMI 486 Enterprise II motherboard;

2. The "ECN Number" (located on a small white sticker near the serial number).

8.2 Unpacking the AMI Module

The AMI module will be shipped to you packed in an anti-static bag and sandwiched between two sheets of sponge. To avoid static electricity hazards, follow the instructions in Section 1.1 for proper handling of the board.

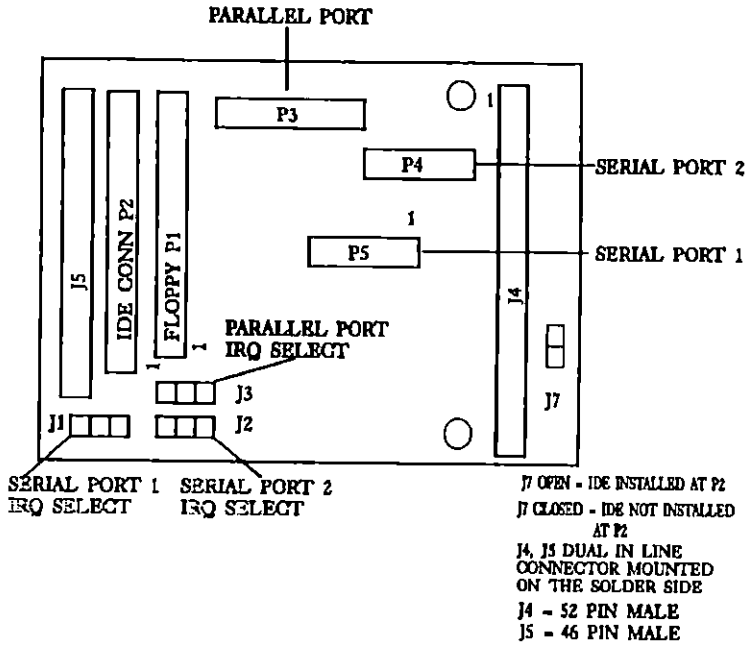
8.3 Installation of the AMI module on Enterprise-II

Before installing the module, gently press all the socketed components on the card to make sure they are properly seated.

The module connects to the motherboard through two dual row receptacles: a 52 pin receptacle and a 46 pin receptacle. The module has two header connectors on the bottom side of the board. The 46 pin header on the module connects to the 46 pin receptacle (J9) on the motherboard; the 52 pin header on the module connects to the 52 pin receptacle on the motherboard. Make sure that all of the pins are straight and lined up properly.

There are two mounting holes close to J1 on the motherboard; similarly, there are two corresponding mounting holes close to connector J4 on the module. Position the module on the motherboard so that the mounting holes match. In this position, connector J4 on the module will be on tip of connector J5 on the motherboard; and connector J5 on the module will be on top of connector J1 on the motherboard.

Then, carefully press the module down into the receptacles until it is seated properly (i.e., there are no gaps between the plastic of the header and the receptacle). See Figure 8.1 for an illustration of the module.



Series 31 AMI Module
Figure 8-1

8.4 Connectors on the Module are as follows:-

P1 Floppy connector

P2 IDE connector

P3 Parallel Port Connector

P4 Serial Port 2 Connector

P5 Serial Port 1 connector

J6 IDE Activity LED

8.5 Option Jumpers

J1 IRQ Selection for Serial PORT 1

1----2	IRQ3
2----3	IRQ4 Default

J2 IRQ Selection for Serial PORT 2

1----2	IRQ4
2----3	IRQ3 Default

J3 IRQ Selection for Parallel PORT 3

1----2	IRQ5
2----3	IRQ7 Default

J7

Open	IDE drive installed
Closed	IDE drive not installed

NOTE: If an IDE drive is connected to the system, then J7 should be kept OPEN, otherwise J7 should be closed. Also, if you are connecting an IDE drive, be sure to connect power to the disk drive.

8.6 BIOS SUPPORT

When the system is turned on, the configuration of the AMI module is performed by the AMI BIOS. The BIOS provides an auto detect feature which configures the AMI module according to the external peripherals attached to the I/O slots. If the BIOS, for example, detects that an external hard disk controller is present, then it disables the on-board IDE controller. Similarly, on detecting the presence of an external I/O card with 2 serial ports and 1 parallel port, the AMI BIOS configures the on-board parallel port as LPT2, and the on-board serial ports as COM3 and COM4.

PAGE
INTENTIONALLY
LEFT BLANK

APPENDIX A

The following are HARD DRIVE TYPES as implemented in the AMI 486 Enterprise-II BIOS. They are used in the Setup and Diagnostics of the CMOS.

Type	Cyl	Heads	Wpcom	Ctrl Byte	Lzone	Secs	Size
1	306	4	128	0	305	17	10MB
2	615	4	300	0	615	17	20MB
3	615	6	300	0	615	17	31MB
4	940	8	512	0	940	17	62MB
5	940	6	512	0	940	17	47MB
6	615	4	65535	0	615	17	20MB
7	462	8	256	0	511	17	31MB
8	733	5	65535	0	733	17	30MB
9	900	15	65535	8	901	17	112MB
10	820	3	65535	0	820	17	20MB
11	855	5	65535	0	855	17	35MB
12	855	7	65535	0	855	17	50MB
13	306	80	128	0	319	17	20MB
14	733	7	65535	0	733	17	43MB
15	0	0	0	0	0	0	0MB
16	612	4	0	0	663	17	20MB
17	977	5	300	0	977	17	41MB
18	977	7	65535	0	977	17	57MB
19	1024	7	512	0	1023	17	60MB
20	733	5	300	0	732	17	30MB
21	733	7	300	0	732	17	43MB
22	733	5	300	0	733	17	30MB
23	306	4	0	0	336	17	10MB
24	925	7	0	0	925	17	54MB
25	925	9	65535	8	925	17	69MB
26	754	7	754	0	754	17	44MB
27	754	11	65535	8	754	17	69MB

28 Type	699 Cyl	7 Heads	256 Wpcom	0 Ctrl Byte	699 Lzone	17 Secs	41MB Size
29	823	10	65535	8	823	17	68MB
30	918	7	918	0	918	17	53MB
31	1024	11	65535	8	1024	17	94MB
32	1024	15	65535	8	1024	17	128MB
33	1024	5	1024	0	1024	17	43MB
34	612	2	128	0	612	17	10MB
35	1024	9	65535	8	1024	17	77MB
36	1024	8	512	0	1024	17	68MB
37	615	8	128	0	615	17	41MB
38	987	3	987	0	987	17	25MB
39	987	7	987	0	987	17	57MB
40	820	6	820	0	820	17	41MB
41	977	5	977	0	977	17	41MB
42	981	5	981	0	981	17	41MB
43	830	7	512	0	830	17	48MB
44	830	10	65535	8	830	17	69MB
45	917	15	65535	8	918	17	114MB
46	1224	15	65535	8	1223	17	152MB

AMERICAN MEGATRENDS INCORPORATED
ONE (1) YEAR LIMITED WARRANTY

This limited warranty is extended by AMERICAN MEGATRENDS INCORPORATED ("AMI") only to the original purchaser of the accompanying AMI microcomputer hardware product (the "Product") and is not assignable to any other person.

For a period of one (1) year from the dte of purchase, AMI warrants that the Product will be free from defects in materials and workmanship, under normal use and service, and will perform substantially in accordance with the description set out in the AMI User's Guide accompanying the Product.

THIS LIMITED WARRANTY IS MADE EXPRESSLY IN LIEU AND TO THE EXCLUSION OF ANY AND ALL EXPRESS OR IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, ANY AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ALL SUCH OTHER WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED.

You are solely responsible for any failure of the Product which results from accident, abuse, misapplication or alteration of the Product and AMI assumes no liability as a consequence of such events under the terms of this Warranty. While AMI has made every effort to provide clear and accurate technical information about the application of the Product, AMI assumes no liability for any events arising out of the use of this technical information.

The sole and exclusive remedy for failure of the Product to conform to this limited warranty shall be for AMI, at its option, to repair or replace the Product, to whatever extent AMI deems necessary to restore the Product to proper operating condition. AMI may make replacements hereunder with new or functionally equivalent products of equal value.

To obtain warranty service, you must (1) call AMI Customer Service (at (404) 263-8181) for a return authorization number; and (2) return the Product, together with (a) the return authorization number, (b) proof of date of purchase, (c) a description of the problem with the Product and (d) your mailing address, postage prepaid to: AMERICAN MEGATRENDS, INCORPORATED, 1346 Oakbrook Drive, Suite 120, Norcross, Georgia 30093. AMI recommends that the Product be packed in anti-static material and packaged adequately for shipping and be insured when shipped. AMI shall not be responsible for damage to the Product in transit. The Product will be returned to you by method and carrier chosen by AMI to any destination within the United States of America. If you desire some other specific form of conveyance or shipment beyond the U.S.A. border, you must bear the cost of return shipment. Please note that if you return the Product without proof of purchase or after expiration of the applicable period of coverge for this limited warranty, AMI will, at its option, repair or replace the Product and charge you the then effective AMI Recommended Retail Price for the Product, unless AMI has discontinued the manufacture or distribution of such products because of technical obsolescence.

THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES WITH RESPECT TO THIS LIMITED HARDWARE WARRNTY OR ANY OTHER WARRANTY, WHETHER EXPRESS OR IMPLIED, AND IN NO EVENT SHALL AMI BE LIABLE TO THE PURCHASER FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, EXEMPLARY OR PUNITIVE DAMAGES FOR CLAIMS ARISING HEREUNDER.

FROM: _____

_____

_____

PHONE: ( ) _____

INVOICE #: _____

INVOICE DATE: _____

RMA #: _____

RMA DATE: _____

FROM: _____

_____

_____

AMI AMERICAN MEGATRENDS, INC.
1346 OAKBROOK DRIVE
SUITE 120
NORCROSS, GA 30093

RMA # _____

DRAFT

American Megatrends, Inc.
1346 Oakbrook Drive, Suite 120
Norcross, GA 30093
(800) U-BUY-AMI, (800) 828-9264
(404) 263-8181, FAX: (404) 263-9381

Enterprise II 5/01/91
Series 16